

Fabrication of Full Page Braille Display Using the Self Supporting and Hydraulic (SSH) System in the Braille Cell Based on the Bending Mechanism of Electroactive Polymer Actuator

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Abstract

A novel hydraulic and latching (SSH) mechanism is invented to make the compact and low power consumption Braille cell based on the bending of the electroactive polymer actuators including PVDF polymer, IPMC and other electroactive polymers. The system comprises a rectangular cavity with four bending elements working at its two sides. The top of the cavity is sealed with a rubber membrane or a preformed membrane and the cavity is full of the water or other appropriate liquid to serve as the pressure transferring medium. The system transfers the bending of the electroactive polymer actuator into the linear motion of the Braille dot. A novel latching mechanism with two supporting blocks attaching to the bending elements and a thin rod attaching to the membrane is invented to provide over 30 grams supporting force which is the required for the Braille dot. The system provides the 0.7 mm displacement which is required for the travel of the Braille dot, large supporting force and quick response time (less than 0.1 second) simultaneously. The highly integrated microelectronic processing technology will be used to make an array of Braille cells. First, a row of the cavities are made and the bending elements are put at the two sides of the cavities. Then the top will be sealed with the membranes and the Cavities are full of the water or other appropriate liquid. By adding different number of rows of the Braille cells the multi line and full page Braille display can be fabricated using this technology.